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were obtainable. These data are uniformly complete and usually accompanied by numerous figures. For example, 42 pages and 40 figures are devoted to the elements. In this chapter on elements there are no less than 237 references to literature given. The monohaloids are described in 40 pages containing 50 figures and 147 references, of which over two pages and six figures are given to ammonium chloride alone.

Chemists, crystallographers and mineralogists have long felt the need of a good reference work of this character and are greatly indebted to Professor von Groth for placing at their command in a clear and concise form such a vast amount of information concerning crystallized bodies. The appearance of the remaining three volumes will be awaited with much interest.

Edward H. Kraus
Mineralogical Laboratory,
University of Michigan,
December 14, 1906

Principles of Botany. By Joseph Y. Bergen, A.M., and Bradley M. Davis, Ph.D. Boston, Ginn & Company. 12mo. Pp. x + 555.

Ten years ago Mr. Bergen, then instructor in biology in the English High School of Boston, brought out an admirable little book entitled 'The Elements of Botany' designed to be a text-book for use in the high schools. It soon became deservedly popular and was very widely used. Five years later there appeared 'The Foundations of Botany,' a much larger book, in which the author, after revising the chapters of his earlier book, had injected a good deal of the new branch of botany—ecology—accompanied with a considerable number of half-tone and other illustrations of leaf-patterns and landscapes, in accordance with the ecological fashion of that day. In the book before us, we have a further modification of the author's idea of the kind of matter to be presented to the young beginner in botany in the high school, and perhaps the first course in college. In its preparation the author associated with him Dr. Davis, until recently of the University of Chicago, so that it appears under their joint authorship.

After a brief introduction, mainly devoted to a definition of botany and its subdivisions (morphology, physiology, plant geography, paleobotany, taxonomy, ecology and economic botany), we have the remainder of the book divided into three parts, viz., I., 'The Structure and Physiology of Seed Plants' (146 pages), II., 'The Morphology, Evolution and Classification of Plants' (257 pages), and III., 'Ecology and Economic Botany' (129 pages). Parts I. and III. are the work of the senior author, while Part II. is from the hand of Dr. Davis.

Part I. is a still further revision of the first dozen or so chapters of the 'Foundations.' The treatment is much briefer, and all 'experiments' are left out, so that instead of 227 pages in the 'Foundations' only 146 pages are given to this portion of the subject in the 'Principles.' Part II. is entirely new matter, and is an admirable presentation of the elements of systematic botany. Dr. Davis has shown his ability to present an outline of this vast subject in such manner as to give the student a clear picture of the whole. The only criticism of this part of the book is that it will probably be found to be quite too full, and perhaps too difficult for pupils in secondary schools, and better adapted to the capacity of college students. Part III. is based upon the second part ('Ecology') of the 'Foundations,' containing, however, much new ecological matter, which is well and clearly presented, and several chapters on economic botany which do not appear to be necessary in a book of this kind. One may seriously question the usefulness to beginning students of chapters including such topics as plant breeding, the production of hybrids, selection among corn, selection among wheat, results of hybridizing citrous fruits, and wheat, food products for human use, and for domestic animals, plant-fibers, timber, forestry and fuel. These subjects can not be adequately treated in an elementary text-book intended for children. The little that is said under each topic is not enough to serve as a beginning of the subject, and there is certainly neither space nor time for more. It has often

been said that the most difficult task in the preparation of an elementary text-book is to make a judicious selection of the things to be included from the vast multitude of things which present themselves. To know what he may safely exclude, and yet make a connected story, which shall be brief enough to be mastered in the time at the student's disposal, is, we admit, not easy to accomplish. To 'touch the high points' and yet to keep up the connection between them is the difficult task of the writer of an elementary text-book. In some portions of the book before us this has been accomplished, while in others a good deal of matter has been admitted which might well have been left out.

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SCIENTIFIC JOURNALS AND ARTICLES

The Journal of Comparative Neurology and Psychology for January includes a paper 'On the Place of Origin and Method of Distribution of Taste Buds in *Ameiurus melas*,' by F. L. Landacre, a study of the embryology of the taste buds of the catfish. He shows that taste buds appear simultaneously in the entoderm of the gill arches and in the ectoderm of the lips. From both of these centers the buds spread backward, from the first into pharynx and œsophagus and from the second into the mucous membrane of the mouth and also into the outer skin, finally reaching the extreme dimensions of the outer surface of the body. No buds migrate from entoderm to the skin. The series of papers on the nervous mechanisms of touch and taste in fishes by C. J. Herrick is continued by 'A Study of the Vagal Lobes and Funicular Nuclei of the Brain of the Codfish.' Instructive comparisons are drawn between the central mechanism of this fish and Ameiurus and an attempt made to explain their difference on the basis of the mode of life of the fishes. There is also given a translation of the recent researches by Minkiewicz on 'Chromotropism and Phototropism.'

SOCIETIES AND ACADEMIES

THE AMERICAN PHILOSOPHICAL SOCIETY.

A STATED meeting was held on January 4, at 8 o'clock. Professor J. C. Branner communicated a paper on 'The Geology of the San Francisco Peninsula,' by Roderic Crandall.

DISCUSSION AND CORRESPONDENCE

THE 'FIRST SPECIES RULE' VS. THE 'LAW OF PRIORITY' IN DETERMINING TYPES OF GENERA

IN connection with the discussion on 'elimination' vs. 'first species,' in determining type species, may I be permitted to bring forward certain points which seem to me to be worthy of consideration?

That some authors are decidedly opposed to 'elimination,' while others are equally opposed to 'first species,' indicates rather strongly that there are valid objections to both methods, or at least that neither method is perfect. Whatever our views in the case may be, it is a matter of record that some authors have adopted the one method, while other authors have adopted the other.

If a given rule of nomenclature is to command the general respect of biologists and not to be subject to change from generation to generation, it should be sufficiently just, objectively, to appeal to all persons who are called upon to apply it and who may be temporarily inconvenienced by its application. The question, therefore, arises whether the 'first species' rule is so inherently just in principle that it will appeal to systematists to sufficiently convince them of the justice of overturning hundreds or possibly thousands of cases of type determination which have been made since 1758, and especially since 1842.

Personally, I view the first species rule as one of enormous convenience, and as one which can be applied, in the vast majority of cases, uniformly by all workers.

That it is necessary (however desirable it may be) to have a rule which will apply uniformly to all genera, is a point which I very seriously doubt. On the contrary, it seems to me that there is a certain amount of advantage in allowing a margin for the exercise of some discretion in certain cases. That two authors may arrive at different conclusions on the basis of elimination does not, therefore, seem to me to condemn it.